

November 17, 2005

MEMORANDUM

To: Environmental Health Managers **GMP #127**
District Health Directors
Virginia Tech Contract Soil Scientists
Office of Environmental Health Services

From: Robert B. Stroube, M.D., M.P.H.
State Health Commissioner

Subject: Use of Proprietary Materials, Methods, and Products Designed to Replace
Gravel in Absorption Trenches

Purpose

This policy is intended to interpret and implement the trench design and construction requirements of the *Sewage Handling and Disposal Regulations* (12 VAC 5-610-20 et seq., the “*Regulations*”) as they pertain to the use of proprietary materials, methods, and products designed to replace or act a substitute for gravel. This policy replaces GMP #102 (Use of Gravel-less Systems) which is hereby rescinded.

Scope of Policy

The *Regulations* (§ 930), prescribe “clean gravel or crushed stone” (gravel aggregate) as the bedding material for gravity (includes enhanced flow) and low pressure distribution percolation lines. Aggregate sizes range from ½ to 1-1/2 inches for gravity percolation lines and ½ to ¾ inches for low pressure distribution lines. Any proprietary, non-gravel trench material, method, or product which complies with this policy shall be deemed to comply with the gravel-aggregate requirements of §§ 930 and/or 940 of the *Regulations*; no separate, product-specific approval by the Division is required. Examples of potentially acceptable materials, methods, or products include, but are not limited to, chambers, large diameter pipes and multi-pipe configurations, and non-gravel aggregates. Proprietary materials, methods, and products meeting the criteria of this

policy may be used with residential and non-residential systems which do not require formal engineering plans and which disperse septic tank effluent, secondary effluent, or secondary-or-better effluent.

Except as noted herein, proprietary materials, methods, and products utilized pursuant to this policy shall be designed, installed, and operated in accordance with the *Regulations* in all respects, including but not limited to, effluent quality, site and soil conditions, minimum trench installation depths, dosing requirements, vertical separation distances from limiting factors, and minimum trench cover. Proprietary materials, methods, and products complying with this policy may be used in repair situations; the design and construction requirements of the *Regulations* must be met “to the greatest extent possible” when repairing an existing, failing system serving an occupied dwelling with indoor plumbing (*Regulations*, § 280.C.2).

Any proprietary material, method, or product that does not conform with this policy, including one that may have enjoyed approval prior to the date of this policy, shall be deemed to fail to meet the requirements of § 930 and/or 940 of the *Regulations*. Such non-conforming materials, methods, or products may be utilized only in accordance with the experimental or provisional approval portions of the *Regulations* (§ 441 et seq.).

This policy does not address the use of tire chips, drip irrigation, elevated mound systems, proprietary pre-engineered systems, Substituted Systems (GMP #116), or systems with experimental or provisional approval.

Formal Plans

Formal plans may be required pursuant to any permit application as provided in § 250 of the *Regulations*. Whenever formal engineering plans are required, the use of proprietary, non-gravel materials, methods, or products conforming to this policy shall be solely at the discretion of the responsible Professional Engineer.

Physical Properties

All proprietary materials, methods, and products intended to replace or act as a substitute for gravel shall be designed by the manufacturer for such purposes and shall be suitable for such purposes. They shall not be influenced by the elements and conditions normally associated with sewage. Such elements and conditions include, but are not limited to, temperature, water, corrosive liquids and gases, and anaerobic conditions. In addition, all proprietary materials, methods, and products shall have a load rating of at least H-10 when installed in a non-traffic area, and should have a load rating of H-20 for installation in a traffic area.

All proprietary materials, methods, and products shall provide:

- o Physical support and protection for the percolation lines (where applicable);

- o Storage volume to temporarily store effluent that has been distributed to the trenches;
- o Air space within the trench to facilitate additional treatment through aerobic processes; and
- o A soil interface at the bottom and sidewalls of the trench to facilitate movement of effluent into the surrounding soil.

Absorption Area Size and Volume

All proprietary materials, methods, and products utilized pursuant to this policy shall provide sizing (trench-bottom area and storage volume) that is substantially equivalent to that provided by a gravel-trench system under the *Regulations* (§ 950 and Table 5.4) based on the design flow and percolation rate. The following shall apply:

- o Absorption area sizing shall be determined in the conventional manner using Table 5.4 of the *Regulations*, the percolation rate, design flow, the “effective width” of the proprietary material, method, or product and trench length.
- o “Effective width” for proprietary materials, methods, and products will be determined as follows:
 - Chamber-type products- based upon the outer-most limits of the product’s contact with the trench bottom.
 - Pipe and multi-pipe products- based upon the pipe diameter or sum of diameters as a projection on the trench bottom.
 - Aggregate substitutes- based upon actual trench-bottom area or upon the outside diameter of the bundled material.
- o Any proprietary material, method, or product with an effective width equal to or greater than 90% of the nominal width of the equivalent gravel trench is deemed to substantially comply with the trench-width requirements of the *Regulations* (see chart below).

Gravel Trench Width (in.)	90% Substantially Equivalent Width (in.)
36	32.4
30	27.0
24	21.6
18	16.2
12	10.8
8	7.2

- o When comparing the storage capacity of a proprietary material, method, or product to gravel aggregate, the gravel aggregate shall be deemed to provide a porosity of 0.35 (volume of voids/total volume).
- o Side-wall area will not be considered in determining the effective width of any proprietary material, method, or product.
- o All proprietary materials, methods, and products shall have a height of at least 8 inches.

Other Requirements

The manufacturer of each proprietary material, method, or product utilized pursuant to this policy shall train and certify every person responsible for installing its material, method, or product. Only those installers authorized in writing by the manufacturer and licensed to install onsite sewage systems in Virginia shall install proprietary non-gravel materials, methods, or products pursuant to this policy. In addition, the manufacturer of a proprietary material, method, or product utilized pursuant to this policy shall, upon request, provide clear written instructions for installation of its material, method, or product. Whenever a proprietary material, method, or product utilized pursuant to this policy is, according to the manufacturer's specifications, subject to a maximum installation depth restriction, the manufacturer shall provide written notice of such restriction to the Division of Onsite Sewage and Water Services and to each installer who is required to be trained and certified pursuant to this policy.

Proprietary, non-gravel materials, methods, or products utilized in systems with gravity distribution may or may not contain a percolation pipe along the length of the trench. Whenever enhanced flow (§ 930.A) or low pressure distribution (§ 940) is required under the *Regulations*, the proprietary material, method, or product utilized pursuant to this policy shall contain a percolation pipe along the entire length of the trench that substantially complies with the requirements of §§ 930.E or 940.C of the *Regulations*.